Remarks

Entry of the above amendments is respectfully requested. Claims 26 and 40 have been amended. Claims 26-44 are pending in the application. Favorable reconsideration and allowance of this application is respectfully requested in light of the forgoing amendments and the remarks that follow, which also take into consideration the Examiner's comments in his September 7, 2005 Advisory Action.

In the Action, the Examiner indicated that he did not receive the substitute Declaration filed together with Applicant's December 30, 2005, Reply. As requested, Applicant has attached a copy of the substitute Declaration signed by each inventor on November 30, 2004. Note that the substitute Declaration clarifies that no priority claim is being made.

Next, the Examiner rejected claims 26-36 as being indefinite under 35 USC §112, second paragraph, contending that the sample and polar solution are part of the intended use of the device, and that Applicant is only defining what "one '*might*' place in the sample support." Although the sample is part of the intended use of the device, Applicant disagrees that disposing the tip at an electrical double layer renders the identified claims indefinite. This feature is not some intended use, claim 26 requires that the tip be placed "in" (formerly "at", amended for clarification purposes) the electrical double layer. Notably, as understood in the art, an electrical double layer exists at all metal/electrolyte interfaces. In other words, the polar solution is indeed part of the claimed invention. And, contrary to the Examiner's contention, Claim 26 does not state that the support "can" accommodate a sample, it says that it

"accommodates", as in "does accommodate." Moreover, due to the fact that the position of the claimed probe is affirmatively claimed as being at the claimed electrical double layer (now "in", as amended, to make it abundantly clear the probe has to be measuring in the electrical double layer), the polar solution is not simply some intended use, the tip has to be in the electrical double layer. One skilled in the art would be able to do so, for instance, by measuring a change in potential as tip-sample separation is reduced, e.g., by a stepper motor.

To make it unmistakably clear that the polar solution is indeed part of the claimed invention, an element required to create the claimed electrical double layer, Applicant has amended claim 26 to alternately define the "polar solution" by separately positioning the same on its own line. Again, this amendment is being made only for clarification purposes and therefore entry and reconsideration of this limitation is believed to be in order. In fact, Applicant respectfully requests that finality be withdrawn in view of the arguments concerning the prior art below given that this rejection has been misplaced throughout prosecution (i.e., the polar solution was a necessary part of the claims form the outset).

The Examiner next rejected claims 26, 27 and 29-35 under 35 U.S.C. § 102(b) as being anticipated by *Horrocks et al.* In particular, the Examiner indicated that *Horrocks et al.* disclose a scanning electrochemical potential microscope and that the *Horrocks et al.* instrument is capable of supporting measurements of a potential gradient, citing figures 2 and 3 as evidence that a potential gradient is established between the sample and the tip. Moreover, the Examiner concludes that *Horrocks et al.* disclose a bi-potentiostat, and thus disclose (1)

using a measured potential as a feedback parameter to control tip-sample separation, and (2) tuning the measurement. Finally, the Examiner contends that forming an electrical double layer, and operating the SEPM exclusively therein, is only a statement of intended use as noted above in connection with the §112 rejections. In addition to the above regarding the §112 rejections, Applicant respectfully disagrees with the Examiner's conclusions for the following reasons.

Initially, it is important to note that the present invention requires a polar solution (as previously claimed, and now clarified) to operate, and requires that the probe be disposed in the electrical double layer (claim 26). While with respect to others of the claims, measuring potential while also feeding back on measured potential (claim 29/30 and 37) is the whole point of each of these claims and the combination of measuring potentials and also feeding back on potential to control tip-sample separation is not disclosed in the cited references.

As noted in the previous Reply, *Horrocks et al.* disclose a scanning electrochemical microscope (SECM), an instrument that is discussed and distinguished at length in the Specification of the present application, including the Background. In this regard, Applicant notes the following concerning SECM. First, although SECM may be operated in a potentiometric collection mode (i.e., measuring potentials), when doing so, SECM uses a relatively large tip that can only operate in the diffusion layer (otherwise, the large tip would be at an unacceptably high risk of crashing into the sample), as opposed to the electrical double layer. The diffusion layer is typically microns high from the sample surface and thus when

imaging at such large tip-sample separations, poor image resolution results, an key metric of any metrology instrument, as understood by those skilled in the art. In contrast, the electrical double layer is typically only several nanometers (or less), such that when measuring the potential gradient at such close range, much higher resolution can be achieved.

Yes, Applicant in the Background mentioned that SECM could be operable down to a tip-sample separation of 1 nm. However, Applicant was only stating what is theoretically possible with SECM. Importantly, Horrocks et al., as well as any other SECM reference for that matter, includes no disclosure regarding placing an AFM tip in the electrical double layer and making corresponding potential measurements. Moreover, the fact is, when operating SECM in the so-called potentiometric collection mode, an ion-selective tip MUST be used. As understood in the art, such a tip cannot be made with a radius smaller than 0.5-1 microns using available techniques. (See Exhibit A, Scanning Electrochemical Microscopy (SECM), noting that a tip diameter "down to 1 μm" (radius of about .5 microns) can be used). The significance of this is that, for example with a 0.5 μm tip, the detected signal is an average of the area directly beneath the tip, limiting resolution to 0.5 μm, both horizontally and vertically, at best. Therefore, this limitation means that the tip can not go much closer than 0.5 μm away from the surface in this mode; otherwise, the tip has a high probability of crashing into the surface, again as well understood in the SPM art.[1] The Examiner is correct that Applicant has not claimed

[1] It is important to note that *Horrocks et al.* not only does not disclose operating a probe to measure a potential gradient at the electrical double layer, the *Horrocks et al.* system is not capable of operation with the tip at the electrical double layer given that the tip radius they disclosed and used was 2.5 microns. As understood in the art,

specific tip radiuses, Applicant is only highlighting this difference to illustrate a consequence of the claimed invention; namely, that an SECM cannot be used to perform measurements in the electrical double layer as in the present invention (a probe disposed in a polar solution and positioned in the electrical double layer when performing potential measurements).

Again, measuring a potential gradient at the electrical double layer is not merely a statement of intended use, it is required by the present invention such that measuring a gradient at some other location (for example, the diffusion layer) is of no use. In the end, because SECM, as described in *Horrocks et al.* or otherwise, is not directed to operating in the electrical double layer, it cannot anticipate the present invention.

Overall, in view of the above remarks and the present clarifying amendment to claim 26, independent claim 26 is novel and non-obvious over *Horrocks et al.*, and an indication to that effect is respectfully requested.

Also, with specific reference to claims 29 and 30, and new claim 37, applicant disagrees that a disclosure of a bi-potentiostat is a disclosure of using a measurement of potential in a feedback loop to control tip-sample separation, as defined in these claims. *Horrocks et al.* contains no discussion or suggestion regarding "feeding back" potential to control tip-sample separation while also making potential measurements, as defined in the claims. Moreover, *Kwak et al.* do not overcome this deficiency. Col. 6, ll. 8-54 was cited as a disclosure of

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using such a tip would restrict *Horrocks et al.* from bringing the tip into the double layer without damaging the tip or the sample.

feeding back on potential (defined in the claims as a potential gradient at the sample surface) to control tip-sample separation. There is no teaching in *Kwak et al.* in this regard. This cited section, as well as Cols. 10 & 11, ll. 45-14, disclose using a bi-potentiostat to maintain a substantially constant current/voltage in a working tip to measure a surface contour. However, this is not a disclosure of feeding back on a measured voltage. Rather, a bi-potentiostat controls the voltage and measures the current at two (2) electrodes immersed in an electrolyte. It provides a relative measurement between the electrodes. Col. 10 does state that the voltage at the working tip 12 can be measured relative to the sample, but, in that case, the sample must be conductive or semi-conductive. No such limitation concerning the sample is present in the embodiments of the present invention because an absolute potential measurement of the gradient formed at the surface of the sample is made independent of whether the sample is conductive or not. And, contrary to the Examiner's suggestion in paragraph 10 of the Office Action, functional limitations cannot be ignored. MPEP §§ 2114 and 2173.05(g) Yes, while the latter MPEP section concerns indefiniteness of functional limitations, by not affording patentable weight to defining the physical relationship between the tip and sample so the tip is disposed at the electrical double layer, the Examiner has rendered the limitation meaningless, contrary to the guidelines of the MPEP. Moreover, in any event, the physical relationship between the tip and the sample is a structural limitation. Claims 29 and 30, as well as claim 37 and its dependents, as a result, are allowable for at least this additional reason.

Conclusion

In view of the present amendments and the above Remarks, it is submitted that claims 26-44 are in compliance with 35 U.S.C. §§ 102, 103 and 112, and thus each define patentable subject matter. A Notice of Allowance is therefore respectfully requested. The Examiner is please asked to contact the undersigned by telephone if it would help expedite the prosecution and allowance of this application.

Applicant respectfully requests an extension of time (EOT) to September 24, 2005, to file the Request for Continued Examination (RCE) and the amendment accompanying the request. A check in the amount of $1360 is enclosed and includes the RCE filing fee ($790) and request for another one-month extension ($570). No other fees are believed to be payable. Nevertheless, should the Examiner consider any fee to be payable in conjunction with this or any future communication, the Director is authorized to direct payment of such fees, or credit any overpayments to Deposit Account No. 50-1170.

Respectfully submitted,

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Dated: September 26, 2005
Customer Account No.: 23598

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